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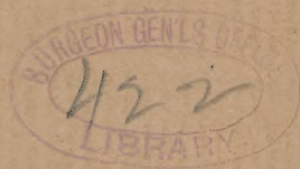
THE NERVOUS AUTONOMY OF THE HUMAN BODY  
IN HEALTH AND DISEASE.

A LECTURE

BY A. F. A. KING, M.D.,

*Professor of Obstetrics, Medical Department, Columbian University,  
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## THE NERVOUS AUTONOMY OF THE HUMAN BODY IN HEALTH AND DISEASE.

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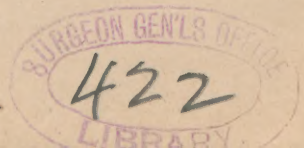
BY A. F. A. KING, M.D.,

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WHEN we reflect that every organ and tissue of the body is made up of countless myriads of cells; that each individual cell lives its own life, performs its own functions, dies its own death, and is replaced by its successor; and when we further consider that the special life-work of each individual cell not only exhibits the usual struggle for self-support and self-preservation, but in the very act of doing so contributes its share toward the support and preservation of the human body of which it constitutes only one insignificant atom, it is almost impossible to avoid the further conclusion that, in order to secure the harmonious working of so many millions of individuals for the benefit of the larger body in which they are contained, they must be regulated by some sort of *general government*. Without such regulation and control, the hosts of cells composing this tremendous population of microscopic individuals would run into riot and disorder. Undoubtedly some such form of government must and does exist; and surely a proper understanding of this automatic autonomy of the human body (while a matter of fascinating interest) becomes one of the most important and essential requisites for medical study and medical practice.

What organs perform the functions of government? What are the laws which the government is striving to administer? Some of them deeply rooted





and inherited through many generations of ancestry, which we may well call *constitutional* laws—others more circumscribed, and applicable only to particular organs which may be likened to *local statutes*. What is the history, and what the origin of these laws?

In the evolution of a highly-developed organism (like that of man) from the lowly monad, modifying itself and its functions from time to time through a long wilderness of ages, what an endless series of amendments to its constitution must have been required! As new organs developed, new regulations for the government of their functions must have arisen; and as old structures, no longer necessary, became atrophied from disuse and dwindled into rudimentary excrescences—like the tonsil, the thymus, the coccyx, the appendix vermiciformis, etc.—what numerous statutes once governing their activities must have become obsolete!

These laws are, for the most part, as yet unwritten, and, as their history leads us back through an infinity of time, so their origin must be traced back, link by link, through an infinity of lower organisms, and thus the doctrine of Evolution becomes the Supreme Court to which our final appeal for an intelligent explanation of the laws governing the constitution of man must be made. Every animal that lives is a commentary upon these laws and helps to explain their origin and meaning. The animalcule and the mammoth, the birds and beasts of the forest, the inhabitants of the sea, even the silent shells upon its shore and the fossils embedded in its rocks, are so many leaves in the Book of Nature, where we may read the recorded history and trace the origin of laws that govern the living beings of to-day, and thus bring ourselves to an intelligent comprehension of that complex epitome of historic legislation displayed in the constitution and by-laws of a human body.

Recurring now to the question, How is this government maintained, and by what organs is it administered? the reply is inevitable: it is the *nervous system*. Indeed, if instead of considering the body *microscopically* which displays millions of individuals, and aggregates of aggregates, we go to the other extreme and regard it *macroscopically*, and this in the coarsest possible manner, we find that the entire structure may be profitably studied as consisting of only *two parts* or two things, viz., (1) the nervous system; (2) all parts other than the nervous system, or, in other words, (1) *organs of government*; (2) *organs governed*. In fact, to go a little farther, we may regard the nervous system not only as a sovereign ruler exercising its dominion over, controlling and co-ordinating other functions and structures, but also as enjoying an absolute and complete *ownership* of all other parts. The nervous system is the individual, and the rest of the body belongs to it; it is lord of the manor, while the other regions of the body constitute its inherited domain—its obedient vassals. It presides over and regulates the distribution of *matter* (blood) and the distribution of *force* (motor power). In also *regulating its own development* during embryonic life and the earlier periods of growth, it has built around itself a habitation of bone for its protection, to which it has appended organs of locomotion, and instruments of special sense; while the numerous viscera of the digestive and nutritive apparatus, with their millions of working cells, are so many pro-



ducing factories ever contributing new material and pouring their manufactured products into the general treasury of matter—the blood—to be again distributed by the nervous system which appropriates to each organ the amount deserved or required in accordance with the degree of its functional activity.

This autocratic nervous system is willingly served by the loyal legions of cells that are taxed for its support, that obey its mandates and are daily and hourly working in obedience to them, thus supporting the government upon the continued administration of which the peaceful and successful pursuit of their own individual life-history entirely depends. It is government with the full consent of the governed. If the government stop, the man dies; and though the microscopic inhabitants may still survive a number of hours, their demise within a short period is inevitable, unless indeed they be transplanted into the organism of another individual where life and government are normally maintained (as is illustrated in the grafting of skin from a corpse into the person of a living individual), when they become, as it were, naturalized citizens of a new territory, under a new government, and thus extend their lease of life.

This intimate and indissoluble relation between the government and the governed is exhibited in every form of animal life, from the lowest and simplest (the nucleus being the governing nervous centre of a simple cell) to the highest and most complex. It is also apparent in every *stage* of life in each individual, from the first beginnings of embryological development until death. The process of *growth* is just as much governed by nervous influence as the act of respiration or the pulsations of the heart. And so of all other processes. This is the common teaching of accepted *physiology*. The government is directed to the welfare and preservation of the entire body, and the better this is accomplished so much the better for the countless individual histological units of which the body is composed.

Having now considered the nervous government of the body in *health*, and its conservative purpose of maintaining the welfare of the individual, let us next carry the same idea into the *domain of disease*. Pathology is only modified physiology. The observed variations in structure and function belonging to disease are subservient to the same reigning power—the nervous system—as are those of health. In order to understand the natural history of any pathological condition—which is a most necessary step towards suitable treatment—we should simply ask ourselves: What is the reigning government of the nervous system trying to do in permitting the observed variations from a normal state to take place? Under the circumstances in which disease occurs, do the processes observed contribute to the welfare and preservation of the individual? Now, from time immemorial it has been almost universally recognized that some processes of disease are conservative, while others are not; and while there are doubtless natural reasons for this difference, they have not been succinctly defined, nor yet all of them discovered.

From what has already been said, we might start out with the following *a priori* proposition, viz.: *Those processes are conservative which are thoroughly under the control of nerve-government; those not conservative are not under this governing control of the nervous system.* For example, a calculus, whether vesical, biliary, or of whatever kind, is always mischievous, never useful. But



let us observe that this calculus is not even *united* with the body politic; it lies loose in a cavity, like a marble in the mouth or a pebble in the ear; it is entirely cut off from any connection with the nervous system. It has been formed not in obedience to the *vital* laws governing the constitution of the body and administered by the nervous system, but in obedience to the laws of physics and chemistry. It is a "foreign body," separate from and not recognized as a part of the social organization of cellular inhabitants, over which the nervous system exercises control. But does the government take no cognizance of this foreign mass in the interior of one of its visceral cavities? It does, and inaugurates certain processes, having for their ultimate design the expulsion of the stone. An attack of renal or hepatic colic is one of these processes, and it is just as much a matter of design on the part of the governing nervous system to expel the stone as the process of labor is designed to expel a child from the reproductive canal. Still again, should the calculus—be it a renal one—lodge in the bladder and fail to be ejected by the urethra, there take place inflammation, ulceration and eventually the formation of a fistulous opening, through which the foreign intruder is expelled. Such cases have been observed, but are rare, because the knife of the surgeon, imitating Nature by artificial means, removes the stone by lithotomy.

There is no conservative utility in a polypus. A polypus has no nerves. Cancers and fibroid tumors are not conservative; they have no nerves. Cancer has long ago been regarded by the microscopist as a "histological mob"—a "rebellion of cells"—a growth without order or government. And thus, perhaps, may we account for the frequent occurrence of uterine cancer late in life. This organ, no longer performing any active function, doubtless has its nerve-supply as well as its blood-supply reduced or suspended. A few of these rebellious cells, having by some means gained a foothold, remain, multiply and grow, *independent of nervous control*, into the malignant neoplasm. It is a growth beyond the frontier; outside the jurisdiction of nerve government; orders cannot reach it.

Dr. Harrison Allen, in his *Anatomy*,<sup>1</sup> tells us that, while the sympathetic system is one of great importance in the economy, the examples are but few in which any application of a knowledge of the nerves composing it has been made to clinical medicine. He then mentions a few isolated cases in which serious diseases were observed to follow (or at least accompany) lesions or injuries of this system. Now in these cases, where the *government itself is defective*—where its communication with certain regions has been impeded or cut off—it must not surprise us to find *conservative utility lacking* in the pathological processes observed to take place.

If now we look at the process of acute inflammation, especially of an extensive character, it appears, at first sight, to exhibit no conservative elements. And why? Because it is the result of imperfect control by the nerve-government. Some cause of irritation, chemical, mechanical or functional, has been too severe for the limited (*always* limited—never infinite) resources of the nervous system to resist or control. The bloodvessels dilate, and through their distended walls there occurs a migration of wandering cells, straying from their

<sup>1</sup> Section V., Nervous System, pp. 582-583.



legitimate paths (the bloodchannels) into the interstitial spaces of the body. These truant cells, like wandering socialists in the body politic, have taken advantage (so to speak) of a temporary defect in the government's police regulations; they have migrated beyond their lines, regardless of law, and have relinquished their normal industrial pursuits. But does the presiding nervous system take no note of this inflammatory "strike" among its industrial inhabitants? Most assuredly it does; otherwise order would never be restored, the inflammation would never subside, the patient never recover.

Let us here observe that a man with an extensive acute inflammation will have fever, thirst, loss of appetite, inability for mental effort and for muscular exertion, and pain in using the inflamed organ. But these inevitable attending phenomena are themselves produced and maintained in obedience to the silent decrees of the governing nervous system. The whole organism is prostrate; the man is disabled and almost as helpless as an infant. It seems as if the government, in permitting the observed phenomena to take place, were bent on suicide rather than on the conservation of the individual's life. And yet, if we view these phenomena understandingly, their conservative and beneficial influence is just as apparent as if the decrees of the nervous system were put down in black and white, something after the following manner, viz.:

Order No. 1. *To the Department of the Digestive Industries.*—The digestive factories will suspend work; appropriations of blood and nerve force for the digestive industry are withdrawn; they are needed to restore order over the inflamed territory. Let the sentinel, "Appetite," guarding the portal of the digestive system, announce: "*No solid food received.*" And it is so. The appetite is gone; no food is desired; none taken; none could be digested if it were taken.

Order No. 2. *To the same Department.*—The organism will be supplied with food that can be absorbed without digestion—a food upon which man can live longer without starvation than upon any other one of the proximate principles of food—a material entering largely into the composition of every tissue and fluid, and necessary for every excretion and secretion. It is *water*. Let the sentinel, "Thirst," proclaim: "*Water received ad libitum.*" And so it is; and the thirsty soul of the fever-stricken patient finds a luxurious enjoyment in every draught; and if the digestive tract cannot absorb enough, the sentinels upon the outer wall—the skin—cry out, "More water yet," and the patient bathes his heated body, and thus, enjoying another luxury, finds repose in the consequent reduction of temperature.

Order No. 3. *To the Department of Muscular Exertion.*—All work in this department is hereby suspended; its appropriations of blood and power are temporarily withdrawn, being needed elsewhere. Let the avenues of muscular effort be closed, and the sentinel at each gate proclaim the general order "*Rest.*" And it is so: the patient incapable of muscular work rests in his bed, like a child.

Order No. 4. *To the Departments of Intellection and Speech.*—All work in these departments is suspended and their appropriations cut off. Mental exertion, worry, anxiety and exciting emotions are forbidden. Conversation and argument are especially interdicted. Let the avenues of speech and intellection



be shut, and over their closed gates write, in the one case, "*Silence*," and in the other, "*Sleep*." And again it is so. The fever patient longs for quiet and repose. He is disturbed by every murmur of conversation; irritated by every question requiring reply, and is annoyed even by the rumble of a wagon upon the street.

So we might go on, almost indefinitely, adding order after order, and edict upon edict, which the presiding government of the nervous system silently prescribes, to conserve the integrity of the organism, to perpetuate its own existence, and restore order under the emergency of acute inflammation, with which it has been overtaken.

Leaving now these orders applicable to the general system, let us go to the seat of the inflammation itself and see what processes, strategies and tactics are here being carried on by the presiding government to quell this inflammatory insurrection of wandering corpuscles. How red the part is! What a tremendous appropriation of blood from the general treasury is being here expended! Every vessel is congested; every capillary gorged. What armies of cells are being here accumulated—one army of loyal individuals to crush out or remove the other army of disloyal wanderers. And if the individual live and the government of the nervous system maintain itself, what takes place? The disloyal cells are removed or destroyed in several ways. In some, their nutrition is cut off; they melt into a kind of milk, by fatty degeneration, and are absorbed as food for the general system. Others are arrested in their wanderings and transformed on the spot, not like Lot's wife, into a pillar of salt, but into fixed connective tissue cells; their further migration is suspended, and they remain imprisoned for life, embedded in the fibrous adhesions, cicatrices and indurations that are always left, like bones on a battle-field, after the inflammatory action is over.

In other instances where the hosts of disloyal cells are tremendously numerous, the processes inaugurated and carried on by the nerve government serve to collect these rebellious hosts together; they are driven to one spot; surrounded; a wall is built about them; they can no longer wander; they cannot escape. The whole mass of them is then extended farther and farther toward the surface of the body, until eventually an opening occurs, through which they are all at once unconditionally exiled and expelled. We call this the process of suppuration, and we witness it in every abscess that bursts and in every boil that breaks. And when the core of the boil is discharged, the core of the rebellion is crushed, and with almost instant relief to the individual.

Note now what takes place in obedience again to the edicts of the presiding system. The blood accumulated at the seat of inflammation returns to its old channels, and the industries of the digestive system are resumed. The former edicts suspending muscular and mental exercise are revoked. The man rises from his bed, weak from loss of nerve power, pale from expenditure of blood and lack of food. Thirst is gone, but the appetite is enormous. A rough loaf of bread in a baker's window appears delicious and makes the man's mouth water. He can hardly get enough to eat. The digestive industries are being resumed with double vigor to repair the loss occasioned by their suspension during the inflammatory process; the government resumes its normal administration, and health is restored by the natural processes, the ability to



execute which has been gradually acquired through long ages of ancestry. In the face of these beautifully conservative processes—these natural methods of restoration—at present so imperfectly understood and so seldom accorded practical recognition, how “dull, stale, flat and unprofitable” is the older creed of the medical art which believed in “curing” an inflammation with a box of pills!

Yet people die. The conservative methods of Nature appear to have failed, and the nerve government to have been deficient or erroneous. But is this any wonder when we consider how frequently the edicts of the nervous system are unrecognized, or disregarded, or even opposed and resisted by the attendants of the patient or by his own voluntary obstinacy? If instead of following the natural instincts which Nature has implanted in him, and which are made manifest to his *senses* by nerves coming directly from the presiding centres, he insist on opposing them; if he will persist in signing checks, reading documents, consulting with clerks and worrying over business and money; if instead of muscular rest he will still walk the street, stand at a counter, or ride in his carriage until almost ready to drop, when he longs to be in bed and knows and feels that is where he ought to be; if he still persist in taking food, perhaps by the persuasion of friends, which he does not desire and cannot digest; and if he refrain from water for which he longs, because it is prohibited by doctors and nurses who do not seem to know the first article of his constitution, then it is not the fault of Nature if he die. If the governed will not submit to the government, punishment is deserved and will come inevitably.

To crystallize what has now been said into definite statements, I conclude with the following propositions:

(1) The human body is composed of a multitudinous population of individuals, each working out its own destiny and welfare, but in doing so contributing to the welfare also of the body politic, of which it constitutes an insignificant unit.

(2) This population is under the direction of a presiding nervous system, which rules them for their own good as well as for its own benefit.

(3) The constitution of the organism, the foundation of its government and laws have been gradually acquired and inherited through ages of ancestry and an infinity of lower organisms.

(4) The presiding government, besides ruling the processes of health, regulates also the phenomena of disease and will conduct them to a favorable termination under specified favorable conditions; that is to say, *inter alia*, the diseased product must not be disunited from the body (like a calculus), but maintained in close communication with the governing power, and provided also that the inherited principles of the constitution be obeyed, and the edicts of the governing nervous system carried out to their designed conservative termination.

As with governments devised by man's contrivance, so with the government of the human body itself. To secure life, peace and prosperity in the one as in the other, the *union of parts* must be maintained, the *constitution respected* and the *laws enforced*. How to do this advisedly, in the treatment of disease, becomes of first importance to every practising physician.











